

AMENDMENTS TO THE CLAIMS

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

Listing of the claims:

1. (Previously Presented) A monolithic ink-jet printhead, comprising:
a substrate having a lower ink chamber to be supplied with ink formed on an upper surface thereof, a manifold for supplying ink to the lower ink chamber formed on a bottom surface thereof, and an ink channel, which perpendicularly penetrates the substrate for providing communication between the lower ink chamber and the manifold;
a nozzle plate having a plurality of passivation layers stacked on the substrate and a metal layer stacked on the passivation layers, the nozzle plate having an upper ink chamber formed therein on a bottom surface of the metal layer, and a nozzle in communication with the upper ink chamber formed on an upper surface of the metal layer;
a heater provided between adjacent passivation layers of the plurality of passivation layers, the heater being located between the upper ink chamber and the lower ink chamber for heating ink contained in the lower and upper ink chambers;
a connection hole providing communication between the upper ink chamber and the lower ink chamber; and
a conductor provided between adjacent passivation layers of the plurality of passivation layers, the conductor being electrically connected to the heater to apply a current to the heater.
2. (Original) The printhead as claimed in claim 1, wherein the upper ink chamber has a diameter the same as or smaller than a diameter of the lower ink chamber.

3. (Original) The printhead as claimed in claim 1, wherein the connection hole is formed at a location corresponding to a center of the upper ink chamber.

4. (Original) The printhead as claimed in claim 1, wherein the connection hole may have a circular, oval or polygonal shape.

5. (Original) The printhead as claimed in claim 3, wherein the heater surrounds the connection hole.

6. (Original) The printhead as claimed in claim 1, wherein the connection hole comprises a plurality of connection holes formed adjacent an edge of the upper ink chamber.

7. (Original) The printhead as claimed in claim 6, wherein the heater has a rectangular shape.

8. (Original) The printhead as claimed in claim 6, wherein the plurality of connection holes are formed around the heater and spaced apart a predetermined distance from the heater.

9. (Original) The printhead as claimed in claim 6, wherein at least a portion of each of the plurality of connection holes is disposed within the boundary of the heater, and the heater defines a plurality of apertures, each of the plurality of apertures exposing one of the plurality of connection holes.

10. (Original) The printhead as claimed in claim 9, wherein each of the plurality of apertures is either a hole surrounding an entire one of the plurality of connection holes or a groove surrounding a portion of one of the plurality of connection holes.

11. (Original) The printhead as claimed in claim 6, wherein the lower ink chamber includes a plurality of hemispherical cavities in communication in a circumferential direction below a respective one of the plurality of connection holes.

12. (Original) The printhead as claimed in claim 11, wherein the ink channel is formed at a central portion of a bottom of each of the plurality of hemispherical cavities.

13. (Original) The printhead as claimed in claim 1, wherein the ink channel comprises a single ink channel formed at a location corresponding to a center of the lower ink chamber.

14. (Original) The printhead as claimed in claim 1, wherein the ink channel comprises a plurality of ink channels formed on a bottom surface of the lower ink chamber.

15. (Original) The printhead as claimed in claim 1, wherein the nozzle has a tapered shape in which a cross-sectional area decreases gradually toward an exit.

16. (Original) The printhead as claimed in claim 1, wherein the metal layer is made of one selected from the group consisting of nickel, copper and gold.

17. (Original) The printhead as claimed in claim 1, wherein the metal layer is formed by electroplating to a thickness of about 30-100 μm .

18-41. (Canceled).

42. (Previously Presented) A monolithic ink-jet printhead, comprising:

- a substrate;
- a nozzle plate, which is stacked on the substrate;
- an ink chamber in which ink to be ejected is contained, the ink chamber including a lower ink chamber formed on the substrate and an upper ink chamber formed on the nozzle plate; an ink channel, which is formed on a bottom surface of the substrate to be connected to the lower ink chamber and supplies ink into the ink chamber;
- a nozzle, which is formed on a top surface of the nozzle plate to be connected to the upper ink chamber and ejects the ink;
- a heater, which is located between the lower ink chamber and the upper ink chamber to be positioned inside the ink chamber and heats the ink in the ink chamber to generate a bubble; and
- at least one connection hole, which connects the upper ink chamber to the lower ink chamber.

43. (Previously Presented) The monolithic ink-jet printhead as claimed in claim 42, wherein a plurality of passivation layers are stacked between the substrate and the nozzle plate, the heater is formed between adjacent passivation layers of the passivation layers, and the at least one connection hole passes through the passivation layers.

44. (Previously Presented) The monolithic ink-jet printhead as claimed in claim 42, wherein the connection hole is formed at a location corresponding to a center of the ink chamber, and the heater has a ring shape surrounding the connection hole.

45. (Previously Presented) The monolithic ink-jet printhead as claimed in claim 42, wherein the heater has a rectangular shape, and a plurality of connection holes are formed adjacent an edge of the heater.

46. (Previously Presented) A monolithic ink-jet printhead, comprising:
an ink chamber in which ink to be ejected is contained, the ink chamber including a lower ink chamber and an upper ink chamber in communication with each other;
an ink channel, which is connected to the lower ink chamber and supplies ink into the ink chamber;
a nozzle, which is connected to the upper ink chamber and ejects the ink;
a heater, which is located between the lower ink chamber and the upper ink chamber and heats the ink in the ink chamber to generate a bubble; and
at least one connection hole, which connects the upper ink chamber to the lower ink chamber.

47. (Previously Presented) The monolithic ink-jet printhead as claimed in claim 46, wherein the connection hole is formed at a location corresponding to a center of the ink chamber, and the heater has a ring shape surrounding the connection hole.

48. (Previously Presented) The monolithic ink-jet printhead as claimed in claim 46, wherein the heater has a rectangular shape, and a plurality of connection holes are formed adjacent an edge of the heater.